102 are positioned in rows 116 that extend to and from the sides of the touch screen 100. Within each row 116, the identical electrodes 102 are spaced apart and positioned laterally relative to one another (e.g., juxtaposed). Furthermore, the rows 116 are stacked on top of each other thereby forming the pixilated array. The sense traces 106 are routed in the gaps 108 formed between adjacent rows 106. The sense traces 106 for each row are routed in two different directions. The sense traces 106 on one side of the row 116 are routed to a sensor IC 110 located on the left side and the sense traces 106 on the other side of the row 116 are routed to another sensor IC 110 located on the right side of the touch screen 100. This is done to minimize the gap 108 formed between rows 116. The gap 108 may for example be held to about 20 microns. As should be appreciated, the spaces between the traces can stack thereby creating a large gap between electrodes. If routed to one side, the size of the space would be substantially doubled thereby reducing the resolution of the touch screen. Moreover, the shape of the electrode 102 is in the form of a parallelogram, and more particularly a parallogram with sloping sides.

[0069] **FIG. 7** is a partial top view of a transparent multi point touch screen **120**, in accordance with one embodiment of the present invention. In this embodiment, the touch screen **120** is similar to the touch screen **100** shown in **FIG. 6**, however, unlike the touch screen **100** of **FIG. 6**, the touch screen **120** shown in **FIG. 7** includes electrodes **122** with different sizes. As shown, the electrodes **122** located in the center of the touch screen **120** are larger than the electrodes **122** located at the sides of the touch screen **120**. In fact, the height of the electrodes **122** gets correspondingly smaller when moving from the center to the edge of the touch screen **120**. This is done to make room for the sense traces **124** extending from the sides of the more centrally located electrodes **122**. This arrangement advantageously reduces the gap found between adjacent rows **126** of electrodes **122**. Although the height of each electrode **122** shrinks, the height H of the row **126** as well as the width W of each electrode **122** stays the same. In one configuration, the height of the row **126** is substantially equal to the width of each electrode **122**. For example, the height of the row **126** and the width of each electrode **122** may be about 4 mm to about 5 mm.

[0070] **FIG. 8** is a front elevation view, in cross section of a display arrangement **130**, in accordance with one embodiment of the present invention. The display arrangement **130** includes an LCD display **132** and a touch screen **134** positioned over the LCD display **132**. The touch screen may for example correspond to the touch screen shown in FIGS. **6** or **7**. The LCD display **132** may correspond to any conventional LCD display known in the art. Although not shown, the LCD display **132** typically includes various layers including a fluorescent panel, polarizing filters, a layer of liquid crystal cells, a color filter and the like.

[0071] The touch screen **134** includes a transparent electrode layer **136** that is positioned over a glass member **138**. The glass member **138** may be a portion of the LCD display **132** or it may be a portion of the touch screen **134**. In either case, the glass member **138** is a relatively thick piece of clear glass that protects the display **132** from forces, which are exerted on the touch screen **134**. The thickness of the glass member **138** may for example be about 2 mm. In most cases, the electrode layer **136** is disposed on the glass member **138** using suitable transparent conductive materials and patterning techniques such as ITO and printing. Although not shown, in some cases, it may be necessary to coat the electrode layer **136** with a material of similar refractive index to improve the visual appearance of the touch screen. As should be appreciated, the gaps located between electrodes and traces do not have the same optical index as the electrodes and traces, and therefore a material may be needed to provide a more similar optical index. By way of example, index matching gels may be used.

[0072] The touch screen **134** also includes a protective cover sheet **140** disposed over the electrode layer **136**. The electrode layer **136** is therefore sandwiched between the glass member **138** and the protective cover sheet **140**. The protective sheet **140** serves to protect the under layers and provide a surface for allowing an object to slide thereon. The protective sheet **140** also provides an insulating layer between the object and the electrode layer **136**. The protective cover sheet **140** may be formed from any suitable clear material such as glass and plastic. The protective cover sheet **140** is suitably thin to allow for sufficient electrode coupling. By way of example, the thickness of the cover sheet **140** may be between about 0.3-0.8 mm. In addition, the protective cover sheet **140** may be treated with coatings to reduce sticktion when touching and reduce glare when viewing the underlying LCD display **132**. By way of example, a low sticktion/anti reflective coating **142** may be applied over the cover sheet **140**. Although the electrode layer **136** is typically patterned on the glass member **138**, it should be noted that in some cases it may be alternatively or additionally patterned on the protective cover sheet **140**.

[0073] **FIG. 9** is a top view of a transparent multipoint touch screen **150**, in accordance with another embodiment of the present invention. By way of example, the touch screen **150** may generally correspond to the touch screen of **FIGS. 2 and 4**. Unlike the touch screen shown in **FIGS. 6-8**, the touch screen of **FIG. 9** utilizes the concept of mutual capacitance rather than self capacitance. As shown, the touch screen **150** includes a two layer grid of spatially separated lines or wires **152**. In most cases, the lines **152** on each layer are parallel one another. Furthermore, although in different planes, the lines **152** on the different layers are configured to intersect or cross in order to produce capacitive sensing nodes **154**, which each represent different coordinates in the plane of the touch screen **150**. The nodes **154** are configured to receive capacitive input from an object touching the touch screen **150** in the vicinity of the node **154**. When an object is proximate the node **154**, the object steals charge thereby affecting the capacitance at the node **154**.

[0074] To elaborate, the lines **152** on different layers serve two different functions. One set of lines **152**A drives a current therethrough while the second set of lines **152**B senses the capacitance coupling at each of the nodes **154**. In most cases, the top layer provides the driving lines **152**A while the bottom layer provides the sensing lines **152**B. The driving lines **152**A are connected to a voltage source (not shown) that separately drives the current through each of the driving lines **152**A. That is, the stimulus is only happening over one line while all the other lines are grounded. They may be driven similarly to a raster scan. The sensing lines **152**B are connected to a capacitive sensing circuit (not shown) that continuously senses all of the sensing lines **152**B (always sensing).